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METHODS AND SYSTEMS FOR TEACHING DYSLEXIC PUPILS.

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THE READING AND SPELLING PERFORMANCES OF PUPILS ATTENDING A PROGRAM IN READING WERE STUDIED TO DISCOVER WHICH READING METHODS OR COMBINATIONS OF METHODS WERE SUPERIOR FOR DYSLEXICS IN CLINICAL AND CLASSROOM SITUATIONS AND WHICH METHODS WERE APPROPRIATE FOR DYSLEXIC AND NORMAL PUPILS WITH MINOR READING DISABILITIES. THE SUBJECTS WERE 722 PUPILS IN GRADES 2 THROUGH 6 IN THE PENNRIDGE SCHOOL IN BUCKS COUNTY, PENNSYLVANIA. SEMIRURAL, WHITE, MIDDLE-CLASS CHILDREN, WITH AN AVERAGE INTELLIGENCE OF 106 AS MEASURED BY A GROUP TEST IN KINDERGARTEN OR FIRST GRADE ATTEND THE SCHOOL. SPECIAL SMALL-GROUP INSTRUCTION IS PROVIDED FOR THE LOWEST 10 PERCENT OF THE PUPILS IN THE SUMMER. AN OPPORTUNITY CLASS IS CONDUCTED FOR SLOW LEARNERS. TESTS ADMINISTERED WERE THE BOTEL READING INVENTORY AND THE READING AND SPELLING TESTS OF THE SCIENCE RESEARCH ASSOCIATES BATTERY. DATA WERE ANALYZED BY READING LEVELS, GRADE EQUIVALENT SCORES, AND EXPECTED AND ACHIEVED MEDIAN SCORES. THE AVERAGE RANGE WAS SIX TO SEVEN LEVELS OF PUPIL PERFORMANCE AT EACH GRADE LEVEL. BY FIFTH GRADE, THERE WERE NO PUPILS READING AS LOW AS BEGINNING SECOND-READER LEVEL. BY SIXTH GRADE, NONE WERE READING AS LOW AS BEGINNING THIRD-READER LEVEL. THE AUTHOR SUGGESTS THAT DYSLEXIA CAN BE ANTICIPATED AND MINIMIZED WITHIN A GOOD DEVELOPMENTAL READING PROGRAM. A DESCRIPTION OF THE INSTRUCTIONAL PROGRAM, REFERENCES, AND TABLES IS PROVIDED. THIS RESEARCH REPORT WAS DELIVERED AT THE NATIONAL CONFERENCE ON DYSLEXIA (PHILADELPHIA, NOVEMBER 19, 1966). (DK)

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METHODS AND SYSTEMS FOR TEACHING DYSLEXIC PUPILS*

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Part I

The Need for Comprehensive Studies of Outstanding Developmental Reading Programs

Well over ninety per cent of the theory, reporting, and research concerning dyslexia is in the areas of definition, etiology, and diagnosis. Relatively little attention has been given to comparing and testing methods of treatment of the dyslexic. And only a fraction of this meager effort has been given to preventive or developmental programs.

At the University of Pennsylvania Reading Clinic, our research associate Mrs. Jane Levine, who is engaged in the mammoth task of summarizing and indexing all the available literature on dyslexia in this country and abroad, includes in her index of treatment methods such diverse procedures as psychotherapeutic treatment; medical treatment; perceptual training; gross motor training; kinesthetic reinforcement; eclectic educational methods; group and individualized methods; and extrinsic reward. Names like Fernald, Orton, Gillingham, Spalding, Delacato, Barger, and Initial Teaching Alphabet, appear in her index.

But as suggested earlier, most of this limited literature on methods and systems is clinical or remedial in nature. Practically nothing is available on developmental or preventive programs. None of the material we have found thus far reports reliable evidence on the extent of success of various procedures. This is not to say that such diverse methods as the Fernald (8) or Gillingham (11) systems have not produced gratifying results for their authors, the students of these authors, and those who have adapted these systems. Rather, it is the case that we do not have

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answers to two fundamental questions:

1. Which of the reading methods or combinations of methods are superior for dyslexics in clinical and in classroom situations?

2. What methods are peculiarly appropriate for dyslexic pupils as compared with normal pupils or those with minor reading disabilities?

Having worked for 15 years as reading consultant for a number of school systems that have developed exemplary programs in reading, I suggest that one way to get answers to these two questions is to study the reading and spelling performance of all pupils who have gone through a good school system, say, through the sixth grade, and to examine the rationale and elements of the program which produce the results found.

In this paper I will present just such information for one school system I have served: The Pennridge Schools* in Bucks County, Pennsylvania.

Since estimates of the incidence of dyslexia in the total population vary from one per cent (18), to 25 per cent (20), such studies as I propose would also provide the data upon which to reach more valid conclusions on this matter. If a definition of dyslexia requires that we rule out poor instruction as a possible cause of reading disability (6,16) we must select for the study of the incidence of dyslexia those school systems which have a demonstrated record of outstanding reading instruction. Data from randomly selected school systems cannot be used because the typical school system is doing a mediocre job of teaching reading, according to a recent national survey of reading practices in our public schools. (1)

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*The Superintendent of Pennridge Schools is Robert Rosenkranz and the Administrative Assistant in Charge of Elementary Education is Mrs. Patricia Guth. These fine educators have main responsibility for organizing the program as well as collecting and providing the data used in this report. One of the most significant features of the program is the In-Service aspect which provides for continuous growth of teacher understanding of pupils and of teacher competency in using media as tools of instruction.

An example of poor practice not uncommon in typical schools is the overplacement of pupils. Schools overplace many pupils when they assign them to books based upon their grade or their performance on standardized silent reading tests rather than on the basis of their oral reading fluency and mastery of easier levels of the program they are using. The frustration which accompanies overplacement produces symptoms of disfluency, poor comprehension, reversals, poor spelling, poor word attack, etc. which are usually given as characteristics of dyslexia. I have estimated elsewhere that 10 to 15 million pupils in this country are probably overplaced (2) in their readers.

Certainly, schools should not be included in the kind of study I am proposing if such an undermining condition as overplacement contaminates the picture. In other words, until we are certain that schools are personalizing reading instruction for each pupil over an extended period, we will have to regard reading disability in these schools as a function of poor instruction in some indeterminate measure.

Part II

Report of the Reading and Spelling Performance of 772 Pennridge Pupils in Grades 2 through 6

Before analyzing the reading and spelling performance of our school population, it is helpful to know about the population we are studying. We should know (1) what kind of community the pupils come from, (2)the intellectual level of the pupils, (3) the average class size, (4) the average cost of educating each pupil, (5) whether these pupils are all products of the school system, (6) what extra-class help is provided in reading, (7) whether all pupils have been included in the study, (8) the

extent of pupil retention, and (9) the grouping pattern of classes. Here are the facts:

(1) The Pennridge school system is semi-rural, white, middle class and largely Pennsylvania German in heritage.

(2)The I.Q. of the pupils is approximately 106. This estimate is based on the performance of all first grade pupils over the past three years on the S.R.A. Primary Mental Abilities Test (K-1) 1963. It would have been a better estimate if similar results were available for all pupils in the study at the first grade level and at their present grade level. However, school administrators believe that this is a fairly accurate estimate of the average I.Q. level in the schools.

(3) The average class size is 27.

(4) The median cost of educating a pupil over the last five years is $370.82, somewhere around the national average. (It is interesting to note that the corresponding figure for many school systems on Long Island, N.Y. during the same period was over $1,000.)

(5) The 772 pupils in this study have attended the Pennridge schools continuously. Seventy five per cent of these pupils began school in kindergarten and 25% began in grade one.

(6) Special small group (average 5) instruction is provided for the lowest 10% of pupils in the summer. Five week, two hour per day programs are available beginning the summer following grade 1. The program is a more personalized version of the program throughout the year. In addition similar instruction was provided last year only for the pupils in grade six.

(7) The performance of eighteen pupils in the two Opportunity

Classes were not included in the tables. These pupils (2.3% of the population being studied) are slow learners as determined by certified Psychologists using individual Binet or Wechsler-Bellevue Intelligence Tests, and by the recommendation of teachers and supervisors. (As a matter of interest the reading performance of the 10 pupils in the older Opportunity class shows that there are two pupils reading at pre-primer level, one at primer, two at first reader, one at beginning second, three at high second, and one at high third.)

(8) Approximately 10 per cent of the pupils repeat one grade level by the time they finish grade six. Repetition almost inevitably occurs in the primary years. No one repeats more than one grade level.

(9) Beginning in grade one each classroom is organized according to reading instructional levels so that no classroom has a range greater than three reader levels.

With this background we can now analyze the data in Tables 1, 2 and 3.

Table 1 is a record of the reading placement of pupils as estimated by the Botel Reading Inventory (3) on September 12, 1966. This test purports to place a pupil at his instruction level. At this level the pupil's performance characteristically must be <u>at least 95% fluent</u> in oral reading <u>and</u> at <u>least 75% correct</u> as measured by percentage of comprehension in independent study in reading workbooks. The actual placement of pupils was checked by Mrs. Patricia Guth, Director of Elementary Education. Mrs. Guth estimates from her experience that the levels given by the tests are valid in at least 90% of the cases and vary only slightly from the pupil's true level in the remainder of the cases.

TABLE I

PER CENT OF PUPILS IN GRADES 2 TO 6 ACHIEVING VARIOUS READING INSTRUCTIONAL LEVELS ON THE BOTEL READING INVENTORY ON SEPTEMBER 12, 1966

READING LEVELS

# OF PUPILS	GRADE	PRE-PRIMER	PRIMER	1ST. READER	BEG. 2ND.	HIGH 2ND.	BEG. 3RD.	HIGH 3RD.	4TH	5TH	6TH	JR. HIGH	SR. HIGH
176	2	5	23	15	28	10	7	8	3	1			
150	3	1	2	3	7	19	20	22	18	8			
160	4			1	1	1	6	21	39	31			
165	5					1	1	9	27	52	6	5	
121	6							2	13	47	12	22	4
772													

Several facts may be observed from Table 1:

1. There is an average range of approximately 6 to 7 levels of pupil performance at each grade level.

2. The following percentages of pupils are reading more than two years below grade placement: 2% of 4th graders
1% of 5th graders
2% of 6th graders

3. By fifth grade no pupils are reading as low as beginning second reader level and by sixth grade no pupils are reading as low as beginning third reader level.

Thus, in this population, after completing fifth grade no pupils with I.Q.'s above 80 appear to be reading at levels commonly associated with dyslexia, i.e. pre-primer through beginning second reader levels.

Several other facts are important to note: First, practically every pupil reading more than one grade level below grade placement has an I.Q. as measured by a certified psychologist of between 80 and 90. Second, only one pupil, a fourth grader, reading at the first reader level is judged by the professional staff to have a low reading score attributable in large measure to emotional factors. Third, only one pupil in the total population being studied is enrolled in a special county class for pupils adjudged to be minimally brain damaged.

These findings certainly suggest that dyslexia can be anticipated and minimized within the framework of a fine developmental reading program based on fundamental principles of child development, linguistic research and learning theory.

Tables 2 and 3 are presented as further confirmation of the performance of these pupils. Table 2 shows the performance of the 486 pupils in grades

TABLE 2

PER CENT OF PUPILS IN GRADES 3 TO 6 ACHIEVING VARIOUS GRADE EQUIVALENT SCORES ON THE S.R.A. READING TEST* (TOTAL SCORE) ON SEPTEMBER 30, 1966

READING GRADE EQUIVALENT SCORES

# OF PUPILS	GRADE	1.0-1.4	1.5-1.9	2.0-2.4	2.5-2.9	3.0-3.4	3.5-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-9.9	10.0+
150	3	1	5	3	29	21	17	15	7	2 } HIGHEST POSSIBLE SCORE		
160	4		1	1	5	6	20	37	10	20 }		
165	5					5	8	18	18	23	21	7
121	6							6	15	21	42	16

*PART OF THE SRA ACHIEVEMENT SERIES - MULTILEVEL EDITION

TABLE 3

PER CENT OF PUPILS IN GRADES 3 TO 6 ACHIEVING VARIOUS GRADE EQUIVALENT SCORES ON THE S.R.A. SPELLING TEST* ON SEPTEMBER 30, 1966

# OF PUPILS	GRADE	SPELLING GRADE EQUIVALENT SCORES										
		1.0-1.4	1.5-1.9	2.0-2.4	2.5-2.9	3.0-3.4	3.5-3.9	4.0-4.9	5.0-5.9	6.0-6.9	8.0-9.9	10.0+
150	3	1	5	17	15	27	24	8	1	2	HIGHEST POSSIBLE SCORE	
160	4		1	2	3	10	13	34	14	23		
165	5					3	6	12	17	17	32	13
121	6					1	2	8	8	23	25	33

*PART OF THE SRA ACHIEVEMENT SERIES - MULTILEVEL EDITION

TABLE 4

COMPARISON OF PUPIL PERFORMANCE ON READING AND SPELLING TESTS WITH GRADE LEVELS AND EXPECTED SCORES

GRADE LEVEL AT WHICH TEST GIVEN	EXPECTED MEDIAN (BASED ON IQ-106)	ACHIEVED MEDIAN		LOWEST SCORE		HIGHEST SCORE	
		READING	SPELLING	READING	SPELLING	READING	SPELLING
3.1	3.3	3.5	3.2	1.2	1.2	6+	6+
4.1	4.3	4.5	4.6	1.3	1.3	6+	6+
5.1	5.4	6.0	6.7	3.2	3.2	11+	11+
6.1	6.5	7.2	7.4	4.2	3.2	11+	11+

3 to 6 on a standardized reading test and Table 3 shows the performance of these pupils on a standardized spelling test. Standardized tests are most useful in showing the general standing of groups of pupils with respect to the standard population (theoretically this represents the total population).

Some of the main features of Table 2 and 3 can be seen in Table 4 where pupil performance is compared with average expectancy at each grade level with the norm and a corrected norm based on the estimate that this pupil population has an average I.Q. of 106.

It can be seen that by the fifth and sixth grades, these pupils on the average score approximately a year above expectancy in reading and spelling. No child in fifth or sixth grade achieved a score lower than two years below grade placement.

Part III

The Pennridge Instructional Program

The instructional program in reading in the Pennridge Schools is, in fact, based on fundamental principles of child development, linguistic research and learning theory. The system of reading instruction might be described in four categories: (1) respect for each pupil's unique pattern of maturation in personalizing his instructional program, (2) provision of broad oral language and written language experiences, (3) provision of multi-sensory experiences to enhance the perception of language, and (4) provision for the learning principles of structure and discovery. Let us examine our beliefs with respect to each of these dimensions of the program

and note briefly the instructional practices which make these beliefs operational.

1. Respect for each pupil's unique pattern of maturation. We believe it is essential to place each pupil at his instructional level in his scaled reading or spelling program and to adjust the program to the individual learning rate of each pupil. To accomplish these goals we

(a) require that each pupil's performance in instructional materials be fluent in oral reading and show high comprehension in silent reading. A breakdown of the pupil in fluency, or comprehension or both, accompanied and identified by the inevitable symptoms of disorientation, disfluency, and vague understanding is regarded as overplacement or frustration. Such performance signals to us the need for helping pupils work for mastery of simpler material in the learning sequences before going on to more complex work. The Botel Reading Inventory is used to place each pupil at his instructional level. This is, of course, only the first step in a continuous appraisal process. Reliability and validity of placement comes from observing the oral and silent reading performance of the pupil in the classroom setting on a day-by-day basis and in making needed adjustments.

(b) systematically teach each pupil high yield sub-skills so that he can advance as quickly as possible from one level to another. These sub-skills include word attack, vocabulary, oral reading, silent reading.

(c) encourage each pupil to read widely among library books of his own choosing. Through the efficient use of the school and classroom library facilities, by providing time during the school day for this kind

of reading, and by our general commitment to cultivate lifetime reading habits we provide the base for completely individualizing the pupil's independent reading program with respect to his level, rate and interests.

2. Provision of broad oral language and written language experiences. We believe that language skills are interrelated and reinforce one another. Two major aspects of this principle involve (a) the need to build reading and writing instruction on a foundation of experience with oral language, and (b) the need to help pupils understand at the outset of reading instruction that writing is a record of speech and that when we read we are converting the alphabetic code back into oral language.

To accomplish this we attempt to provide for each pupil:

a. rich listening, speaking, and dramatic experiences designed to improve and extend his control over vocabulary and over the communication structures of articulation, syntax, intonation (the melodies of speech), paralanguage (the sounds of emotion), and kinesics (the use of facial expression and body movement). Since the only sounds which we record systematically are vowel and consonant sounds, we must help pupils appreciate and reconstruct the other missing structural elements.

b. many opportunities to see his speech or oral sentences represented immediately by written sentences as the teacher records what he says on the chalkboard or on paper.

c. systematic help in learning to recognize and write the alphabet.

d. many opportunities to write his own ideas and read (really

speak) them back again from the written record.

e. specific and continuous help in learning that consonant and vowel sounds are represented by letter patterns.

3. Provision of multi-sensory experience to enhance the perception of language. We believe that learning takes place by way of our sensory apparatus. Lepman (21) has suggested that individuals may differ in modality maturation and they may be genetically visile or audile. If this is true, then it is important to provide instruction that is sensitive to these different types. Even if this theory is true it is possible that the meaning for instruction is not that different emphases be provided for different types, but rather that all sensory modalities be cultivated and brought to bear on learning tasks, including tactile and kinesthetic modalities.

In fact, it seems that one area of consensus, among the various (and very different) approaches for teaching reading to dyslexic pupils, can be found in their support for a multi-sensory approach to learning.

Three major ways in which we provide for multi-sensory experiences are:

a. Pupils who show unreadiness to begin formal reading are helped to develop gross muscle and fine muscle control through perceptual motor experiences like those recommended by Kephart (12), de Hirsch (7), Maney (15) and Frostig (10). Such activities are concerned with the development of increased awareness of body image, coordination and laterality. They include unhurried but structured opportunities to throw, skip, jump, ride a bike, hop, walk a plank, handle materials and toys (including geometric forms and letters), build

blocks, finger paint, play rhythm games, engage in general calisthenics or muscular fitness activities, copy designs including letters and other geometric shapes, write on the chalkboard or blank paper, and use stencils to produce letters and geometric shapes.

b. Pupils are helped to see and feel speech as well as to produce and hear it. Their attention is focused on the speech mechanism as the teacher produces and contrasts sounds in word pairs that have minimal contrasts in various positions: such as hat-cat, at-it, pat-pot, pan-pat. Pupils study their own speech mechanism in similar articulatory exercises, sometimes with the help of mirrors.

c. Pupils learn letters, words and sentences by looking at, saying, tracing, copying and writing from memory from the beginning. Tracing and copying is generally dropped for most pupils within a few months or a year--as soon as they demonstrate their ability to master their work readily without such tactics. Such instruction is regarded as spelling and handwriting as well as reading. Dyslexic pupils--those whose progress is significantly slower than their general aptitude would suggest--should continue the tracing until they themselves realize that they no longer need this reinforcement. Pupils are the best guide in making this decision. It is an individual matter.

4. Provision for the learning principles of structure and discovery. We believe with Bruner (5) that teaching the structure of a subject, rather than limiting study to facts, memorized rules and manipulations is very important in learning. Emphasis on structure simplifies a subject, makes it more understandable, insures greater recall, and increases pupil interest. The structures of language and communication which we have already mentioned (sound-letter pattern relationships, intonation, syntax, etc.) are presented to pupils in such a way that they will better understand the logical interrelationships of the elements under study. Further, these interrelationships are presented by a discovery method. That is, pupils are challenged to look for patterns and clues and guided to draw logical conclusions and rules for themselves. (Explication of this belief in the use of structure and discovery in teaching reading requires more space than the other three aspects of instructional design we have been discussing. This does not imply that the final topic is of greater moment than the others. Rather, it is because of the difficulty of making the ideas clear without the use of more illustrative material.) Examples of application of the ideas of structure and discovery are found in two categories of content: sound-spelling pattern study and sentence pattern study.

a. Sound-spelling pattern study

In one aspect of vocabulary study, i.e. sound-spelling patterns, we move from he regular spelling of words to the less regular and then irregular spellings. The words in such study are presented in patterened sets.

Examples of some early patterns which would be taught in the instructional design we have been describing and

in such a way that discovery is fostered, are:

cat	man	dad
hat	pan	mad
↓	↓	↓
bib	bud	hid
bin	bug	hip
↓	↓	↓
bat	pan	bad
bit	pin	big
↓	↓	↓
cape	same	
cave	name	
↓	↓	
take	can → cane	
gave	at → ate	
↓		

Note that the arrows suggest that the patterns can be extended to include more words. As pupils examine the patterns or <u>structures</u> to see how they are alike and different with respect to sound and letter patterns they will be able to <u>discover</u> for themselves how they can be extended. Telling is not out of the question but whenever possible teachers ought to foster discovery by adding additional clues. Study of the rule in the formal sense is postponed until pupils have studied the pattern and extended it in this intuitive manner. Actual emphasis on

the statement of the rule is minimal until the upper grades.

Later patterns become more complex, of course, revealing the alternative ways of spelling given sounds and structural changes in the root elements of words which have endings added. Such patterns as:

/a/

ate	rain	may	run → running
cake	paid	stay	hop → hopping
↓	↓	↓	
come → coming			penny → pennies
hope → hoping			baby → babies

The scope and sequence of such patterns are set forth in several books such as Fries (9) and Botel (4).

b. Sentence Pattern Study

In the study of sentence patterns, we make use of the fact that certain sentence patterns occur with great frequency in English. For example, sentences having the following basic structures and the variations, elaborations, and combinations of these sentences make up perhaps 80-90% of the sentences in the speech of typical Americans.

[Noun]	[Verb]	[Noun]
The boy	plays	the piano.
The engineer	builds	the highway.
The _____	_____s	the _____.

Noun	Verb
The lion	growled.
The boy	whistled.
The _____	_____ed.

Noun	Linking Verb	Noun
The man	is	an engineer.
The flower	is	a rose.
The _____	is	a _____.

Noun	Linking Verb	Adjective
The flower	is	very beautiful.
The boy	is	very unhappy.
The _____	is	very _____.

Many kinds of activities are suggested by these patterns which will help pupils get the feel for written sentences and their relationship to oral sentences. As pupils explore structure sentences such as

Those _____s are _____ing my _____.

they will come to see how structure serves as a vehicle for meaning. That is, they begin with structural elements only: word order, structure words (like the, those, are, my) and endings (like s, ed, ing) and, using these clues, create sentences by adding words to make the structure sentence sensible. They then experiment with adding words, phrases

and clauses in various positions before, after and within the sentence. This kind of experience helps pupils actually see how modification of the meaning of sentences are affected by such elaborations of basic sentence patterns. Moreover, it helps pupils learn to express their ideas better both orally and in writing. By thinking of the word with such sentences, not as filling in the blanks, but rather as a way of thinking about and saying total utterances, we are working with intonational structures as well. In this way we encourage pupils to read these sentences aloud with the melodies of speech.

Again the scope and sequence of such syntactic patterns are set forth in several books such as Roberts (17), Lloyd and Warfel (14), Lefevre (13), Strickland (19) and Botel (4).

Clearly, the foregoing sketchy description of the Pennridge reading program suggests a broadly based flexible developmental program--one which from the beginning is sensitive to the level, rate and motivation of each pupil. From the point of view of this conference, the results in Part II of this report suggest that with similar populations as that in Pennridge Schools, few pupils, if any, need to be reading lower than fourth grade reading level by the end of sixth grade.

More studies like this one, of total pupil populations in different regions of the country and in different communities--urban, suburban and rural, where good programs have been in force for an extended period, should suggest the high-yield elements and the alternatives in the design of a reading system which will serve all pupils including dyslexics.

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